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| 09/744,029 | 01/19/2001 | Keiji Takakusaki | L9289.01103 | 2373 |

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| EXAMINER | |
|---|---|
| LE, NHAN T | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2685 | |

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/744,029 | TAKAKUSAKI, KEIJI | |
| | Examiner | Art Unit | |
| | Nhan T Le | 2685 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-22,24 and 25* is/are allowed.

6)☒ Claim(s) *1,9-12 and 23* is/are rejected.

7)☒ Claim(s) *2-8,13 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites the limitation "said first attenuating means" in lines 9-10, page 61. There is insufficient antecedent basis for this limitation in the claim.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 9, 10, 11, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art of fig. 1 in view of Sokal (US 3,900,823).

As to claim 1, Applicant's admitted prior art teaches a communication apparatus comprising:

generating means (see applicant's admitted prior art, fig. 1, number 9) for generating a transmission signal and gain control signal;

amplifying means (see applicant's admitted prior art, fig. 1, number 15) for amplifying the transmission signal with a gain according to the gain control signal; Applicant's prior art fails to teach an error detecting means for calculating input/output errors of this amplifying means; and correcting means for correcting the transmission signal and gain control signal generated by the generating means so as to eliminate the errors. Sokal teaches an error detecting means for calculating input/output errors of this amplifying means (see fig. 1, number 10, col. 5, lines 9-20); and correcting means (see fig. 1, number 8, col. 5, lines 20-33) for correcting the transmission signal and gain control signal generated by the generating means so as to eliminate the errors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Sokal into the communication apparatus of Applicant's prior art in order to correct the transmission signals.

As to claim 9, the combination of the admitted prior art and Sokal teaches the communication apparatus, further comprising an attenuating means (see Sokal fig. 1, number 3, col. 5, line 48- col. 6, line 2) for attenuating the output signal of the amplifying means according to a gain control signal, wherein the error detecting means calculates an input/output error of the amplifying means using the signal attenuated by the first attenuating means.

As to claim 10, Applicant's admitted prior art teaches the communication apparatus, further comprising a plurality of amplifying means (see fig. 1, numbers 15,

16) and antennas (see fig. 1, numbers 2, 3) for emitting the output signals of this amplifying means, wherein when the generating means generates transmission signals and gain control signals corresponding to the amplifying means, the plurality of antennas multiply the transmission signals and gain control signals by coefficients to form directivity.

As to claim 11, Applicant's admitted prior art teach the communication apparatus according to 10, further comprising switching means (see fig. 1, numbers 17, 18) for sequentially outputting signals used to calculate input/output errors of the amplifying means to the error detecting means.

As to claim 23, Applicant's admitted prior art teach a base station apparatus comprising a communication apparatus, the communication apparatus comprising:

generating means (see applicant's admitted prior art, fig. 1, number 9) for generating a transmission signal and gain control signal;

amplifying means (see applicant's admitted prior art, fig. 1, number 15) for amplifying the transmission signal with a gain according to the gain control signal; Applicant's prior art fails to teach an error detecting means for calculating input/output errors of this amplifying means; and correcting means for correcting the transmission signal and gain control signal generated by the generating means so as to eliminate the errors. Sokal teaches an error detecting means for calculating input/output errors of this amplifying means (see fig. 1, number 10, col. 5, lines 9-20); and correcting means (see fig. 1, number 8, col. 5, lines 20-33) for correcting the transmission signal and gain control signal generated by the generating means so as to eliminate the errors.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Sokal into the communication apparatus of Applicant's prior art in order to correct the transmission signals.

2. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art of fig. 1 in view of Sokal (US 3,900,823) and in further view of Kawano (US 5,774,797).

As to claim 12, the combination of the admitted prior art and Sokal teaches the communication apparatus comprising the correcting means and the error detecting means. However, the combination of Sokal and Applicant's prior art fails to teach that the converting means converts a corrected transmission signal and gain control signal to an analog signal and the error detecting means converts the input signal to a digital signal. Kawano teaches the converting means converts a corrected transmission signal and gain control signal to an analog signal and the error detecting means converts the input signal to a digital signal (see fig. 1, number 140, fig. 15, col. 14, lines 46-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Kawano into the communication apparatus of Sokal and Applicant's prior art in order to adjust the transmission signal of the amplifier in case the amplifier operates in analog mode.

***Allowable Subject Matter***

Claims 2-8, 13, 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to claim 2, the applied reference fails to teach the communication apparatus, wherein the error detecting means calculates a phase difference between the input signal and output signal of the amplifying means and a difference between an amplitude difference between the input signal and the output signal of the amplifying means, and an expected value as an input/output error of the amplifying means as specified in the claim.

As to claim 3, the applied reference fails to teach the communication apparatus, further comprising radio frequency modulating means for modulating the transmission signal generated by the generating means to a radio frequency and outputting to the amplifying means, wherein the error detecting means calculates a phase difference between the input signal of the radio frequency modulating means and the output signal of the amplifying means and a difference between an amplitude difference between the input signal of the radio frequency modulating means and the output signal of the amplifying means and an expected value as an input/output error of the amplifying means as specified in the claim.

As to claim 4, the applied reference fails to teach the communication apparatus, further comprising a quadrature modulating means with an analog element structure that quadrature- modulates the transmission signal generated by the generating means, wherein the error detecting means calculates a phase difference between the input signal of the quadrature modulating means and the output signal of the amplifying means and a difference between an amplitude difference between the input signal of the quadrature modulating means and the output signal of the amplifying means, and an

expected value as an input/output error of the amplifying means as specified in the claim.

As to claim 5, the applied reference fails to teach the communication apparatus, further comprising a first frequency converting means for converting signals used to calculate an input/output error of the amplifying means to a same low-frequency, wherein the error detecting means calculates the input/output error of the amplifying means from the output signal of the first frequency converting means as specified in the claim.

As to claim 6, the applied reference fails to teach the communication apparatus, further comprising a second frequency converting means for converting a signal to a low frequency and a first switching means for sequentially outputting signals used to calculate input/output errors of the amplifying means to the second frequency converting means, wherein the error detecting means calculates an input/output error of the amplifying means from the output signal of the second frequency converting means as specified in the claim.

As to claim 7, the applied reference fails to teach the communication apparatus, further comprising a first mixing means for mixing the output signal and input signal of the amplifying means, wherein the error detecting means detects an input/output error of the amplifying means from the output signal of the first mixing means as specified in the claim.

As to claim 8, the applied reference fails to teach the communication apparatus, further comprising second mixing means for mixing the input signal of the radio

frequency modulating means and the output signal of the amplifying means; and third frequency converting means for converting the frequency of the output signal of the second mixing means to 0, wherein the error detecting means detects an input/output error of the amplifying means from the output signal of the third frequency converting means as specified in the claim.

As to claim 13, the applied reference fails to teach the communication apparatus, further comprising amplitude/phase characteristic storing means for storing the amplitude/phase characteristic of the transmission signal versus the gain of the amplifying means based on the output signal and gain control signal of the error detecting means in a calibration table, wherein the correcting means corrects the transmission signal and gain control signal based on the content of the calibration table.

Claims 15-22, 24, 25 are allowed:

As to claim 15, Sokal (US 3,900,823) teaches amplifying and processing apparatus for modulated carrier signal, Kawano (US 5,774,797) teaches automatic gain control circuit with input and output signal detectors operating in equalized condition, Iwata (US 6,597898) teaches automatic gain control method and device. These teaching of these prior arts either combine or alone fails to teach error detecting means for calculating amplitude and phase errors between auto-gain control signals and demodulated signals output from the radio apparatuses and an auto-gain control signal and demodulated signal output from the calibration apparatus; and correcting means for correcting the amplitude and phase of the auto-gain control signals and demodulated signals output from the radio apparatuses so as to eliminate the errors.

Dependent claims 17-22 are allowed for the same reason.

As to claim 16, Sokal (US 3,900,823) teaches amplifying and processing apparatus for modulated carrier signal, Kawano (US 5,774,797) teaches automatic gain control circuit with input and output signal detectors operating in equalized condition, Iwata (US 6,597898) teaches automatic gain control method and device. These teaching of these prior arts either combine or alone fails to teach error detecting means for calculating amplitude and phase errors between the signal amplified by each of the radio apparatuses and the signal amplified by the calibration apparatus based on the mixed signal and calculating amplitude and phase errors between the auto-gain control signal output from each of the radio apparatuses and the auto-gain control signal output from the calibration apparatus; and correcting means for correcting the amplitude and phase of the auto-gain control signal and demodulated signal output from each of the radio apparatuses so as to eliminate the errors as specified in the claim.

As to claim 24, Sokal (US 3,900,823) teaches amplifying and processing apparatus for modulated carrier signal, Kawano (US 5,774,797) teaches automatic gain control circuit with input and output signal detectors operating in equalized condition, Iwata (US 6,597898) teaches automatic gain control method and device. These teaching of these prior arts either combine or alone fails to teach error detecting means for calculating amplitude and phase errors between the auto-gain control signal and demodulated signal output from the radio apparatuses and the auto-gain control signal and demodulated signal output from the calibration apparatus; and correcting means for

correcting the amplitude and phase of the auto-gain control signal and demodulated signal output from each of the radio apparatuses.

As to claim 25, Sokal (US 3,900,823) teaches amplifying and processing apparatus for modulated carrier signal, Kawano (US 5,774,797) teaches automatic gain control circuit with input and output signal detectors operating in equalized condition, Iwata (US 6,597898) teaches automatic gain control method and device. These teaching of these prior arts either combine or alone fails to teach calculating a difference between phase and amplitude difference before and after amplification, and an expected value as an error.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wessel (US 6,275,685) teaches linear amplifier arrangement.

Kumagai (US 5,768,694) teaches automatic gain control circuit with input and output signal detectors operating in equalized conditions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T Le whose telephone number is 703-305-4538. The examiner can normally be reached on 08:00-05:00 (Mon-Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on 703-305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nhan Le

2-9-04

NGUYEN T. VO
PRIMARY EXAMINER